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Economic Retail Data Provides Key Information

By: Henry Oppermann

A key part of all reviews of government programs is the need to demonstrate the economic impact and importance of its programs. The NIST Weights and Measures Division (WMD) benchmark study when completed will include significant economic information to reflect the many retail activities affected by regulatory activities. Since the U.S. Census Bureau conducts an economic survey every five years, NIST plans to use the economic census as a key source of information for its study. This information may be useful to weights and measures jurisdictions as directors explain their program operations and prepare budget justifications.

Some examples of the types of information on the 1992 and 1997 Census Bureau reports for the country and individual states are available on the Internet:

<http://www.census.gov/epcd/www/econ97.html> and

<http://www.census.gov/epcd/www/ec97st.htm>. (The 2002 economic census report should be available in 2004.) The retail trade sectors are of significant interest. The comparative statistics for 1992 and 1997 include the number of business establishments for each year and the change in the number of businesses. Similarly, sales are reported for these years, as well as the changes in the total sales.

In 1992 the economic census used the 1987 Standard Industrial Classification (SIC) system to classify the data. In 1997 the data were classified using both the SIC system and the North American

Industry Classification System (NAICS). The NAICS changed the groupings of businesses contained in the many categories of the economic census. Unfortunately the SIC and the NAICS classifications cannot be compared since the business groupings are not the same. Nevertheless, the SIC data from 1992 to 1997 and the NAICS data from 1997 to 2002 (when available) will provide important information on the trends in the marketplace.

Specific information in the retail sector include establishments and sales for food stores (supermarkets and other grocery stores), meat markets, convenience stores, gasoline service stations, fuel oil dealers, LP gas dealers, hardware stores, home centers, and many others. The economic census provides a great source of information and an extremely helpful source of data for the review of government programs. ♦

Two New Position Vacancies in the Laws and Metric Group

By: Tom Coleman

The Laws and Metric Group of the NIST Weights and Measures Division is seeking qualified persons interested in pursuing a career with the Federal government. One position is for an administrative specialist; the other position is for a weights and measures coordinator.

Administrative Specialist

The duties of this position include serving as the Laws and Metric Group's expert on the use of the metric system (International System of Units [SI]) and providing assistance to government, business, public, and industry (e.g., standard

development organizations) in implementing and using the metric system in trade and commerce both domestically and internationally. Responsibilities will include promoting a better understanding and use of the metric system through information and education programs using a broad range of media and forums; researching, analyzing and publishing information about the level of metric usage (and other measurement related subjects), its benefits, and practices that minimize costs and adverse impacts; developing and updating metric guides, informational publications and other educational materials; preparing and presenting formal talks and presentations; writing technical articles and papers on metric and other measures issues; reviewing and editing draft documents written by others; organizing and leading meetings (including preparing agendas and writing reports); leading and coordinating the development and resolution of a wide range of issues with a variety of interested parties; advising the Group Leader on technical policy, and other matters; and representing the Group in a broad range of public and private organizations and activities.

Specialized Experience:

Experience that demonstrates both a comprehensive understanding of the commercial measurement system and an advanced working knowledge of the International System of Units is critical to this position. The candidate should have experience that shows outstanding communication and interpersonal skills that demonstrate the candidate has led an effort or managed a program involving the conversion to or extensive and primary use of the metric system in manufacturing designs, processes, products (including labeling) or other applications, either in

business, industry, government or other entities.

Weights and Measures Coordinator

The duties of this position include providing technical assistance, guidance, and training to weights and measures officials and industry representatives regarding the model weights and measures law, packaging and labeling regulations and related test procedures, method of sale regulation, and price verification and related test procedures contained in NIST Handbooks 130 and 133. Additionally, the successful candidate will conduct studies and collect information from appropriate sources to analyze a wide variety of weights and measures issues related to the laws and regulations mentioned above in order to provide guidance and leadership to technical committees and working groups. Duties also include developing and updating training material, developing and delivering formal talks and presentations, writing technical articles and papers on weights and measures issues, reviewing draft documents written by others, preparing meeting agendas, writing meeting reports, and coordinating the development and resolution of these issues with industry representatives and weights and measures officials. Knowledge and experience in the application of the laws, regulations, and enforcement policies, practices, and procedures for the control of the commercial measurement system are required. Knowledge and experience in applying basic statistics and basic physics are highly desirable. Knowledge and experience in adult education concepts are desirable.

For more information concerning these positions, please contact Ken Butcher, 301-975-4859 or Tom Coleman, 301-975-4868. ♦

2003 W&M Directory Available

By: Lynn Sebring

The 2003 directory of weights and measures officials, state petroleum personnel, and federal contacts has been mailed to all State Directors. Every effort has been made to assure that the information is up to date and correct; however, the accuracy of the directory depends upon feedback from all jurisdictions as to any changes that occur within a department: the personnel, location, phone and fax numbers, and email addresses.

If you find any errors or corrections to be made in your listing, please contact Lynn Sebring at NIST by phone at 301-975-4006 or by email at lynn.sebring@nist.gov.

There are a limited number of hard copies available on a first-request, first serve basis. The directory is also available in Adobe Acrobat PDF to any state or local jurisdiction upon request. ♦

Review of OIML Taximeter Code Nears Completion

By: Juana Williams

The International Organization of Legal Metrology (OIML) review process for International Recommendation Number 21 Taximeters (R21) is expected to be completed in early spring 2003. R21 is the model regulation that is the basis for the manufacture and use of taximeters in commercial applications and was last published in 1975. R21 includes specifications, tolerances, and test notes used internationally to verify that a taximeter conforms to requirements.

The United Kingdom is the Secretariat responsible for committees developing model regulations for instruments used to measure vehicle speed and distance and will coordinate all work on R21. The United States is an active member nation on the subcommittee responsible for developing the latest version of R21.

Membership on the subcommittee allows the United States to have a voice in a process that improves technology and encourages international trade. Technical committees such as the NCWM Specifications and Tolerances Committee consider international requirements in its work to develop device and instrument requirements. Therefore, U.S. participation on the technical subcommittee for R21 is an important cooperative effort.

A national work group is planned to develop the U.S. position on the latest version of R21. Please contact Juana Williams at 301-975-3989 or by email at juana.williams@nist.gov if you are interested in participating in the U.S. National Work Group or would like information on how work is progressing on R21. ♦

Applying One-half “d” Tolerances

By: Juana Williams

This discussion applies to digital scales that round to the nearest division (d), which function as normal “round off” scales. The maintenance tolerances in Table 6 NIST Handbook 44 (H44) Scales Code 2.20. are specified in whole scale divisions. H44 also specifies that the acceptance tolerance values are one-half the maintenance tolerance values. Tolerances ending in one-half d should not be rounded.

The WMD receives numerous questions about how to apply the tolerance or interpret the error in the scale indication when a scale tolerance ends in one-half d, because you cannot directly read to one-half division on a digital scale. As a practical matter, a scale can be tested using direct reading or by using error weights. Either method is acceptable. Weights and measures officials typically use direct reading because it is more efficient and the focus of their work is to determine whether the scale meets or exceeds the tolerance limits. The use of error weight testing allows you to

determine scale error to a finer weight value than you can derive from the displayed indication.

To illustrate how to apply acceptance tolerances consider a Class III 30-lb x 0.01-lb digital-indicating scale that rounds to the nearest scale division. The acceptance tolerance for test loads between 0 to 500 divisions based on Table 6 is 0.5 d, which corresponds to 0.005 lb in our example of a digital scale. The acceptance tolerance values calculated for a digital-indicating scale cannot be read in the same manner as a mechanical scale. On a mechanical scale you are able to see which weight value is closer to the index of the indicator.

To determine whether or not the digital scale complies with acceptance tolerance, place a 1-lb test weight on the scale; with 100 divisions on the scale the device must meet an acceptance tolerance of plus or minus 0.5 d. To be within acceptance tolerance, the scale must measure the 1-lb load to be a weight value of 0.995 lb to 1.005 lb; however, the scale does not have the ability to display weight values less than 0.01 lb.

If a digital “round off” scale interprets the 1-lb load as a weight value of 0.995 lb to 1.005 lb, inclusive, then the rounding of the weight value to the nearest scale division means that the scale will indicate 1.00 lb. Hence, the scale is within acceptance tolerance. Following is an illustration of how to apply the acceptance tolerance to a scale with a 0.01-lb division size and a 1-lb test load:

-If the indicated weight is 1.00 lb, the scale meets the ± 0.5 d tolerance;

-If the indicated weight is stable at 0.99 lb or at 1.01 lb, the scale exceeds the 0.5 d tolerance;

-If the indicated weight is flickering between 0.99 lb and 1.00 lb or between 1.00 lb and 1.01 lb, the scale is in what is considered a “zone of uncertainty.” This

is called the zone of uncertainty because the scale is at a point halfway between scale divisions where the scale may alternately display one weight value and sometimes display another weight value. The scale should be considered within the 0.5 d tolerance.

NOTE: Later generations of electronic scales have stability features in their programming where the zone of uncertainty may be much less than 0.3 d, or virtually undetectable; for example, at a 0.1 d zone of uncertainty you may not be able to see flickering of the indication between two adjacent weight values. Error weights may be used at any time when testing a digital-indicating scale where the environmental conditions permit. ♦

Completion of Handbook 143 & ISO/IEC 17025 Checklists and Internal Audits Mandatory for Laboratory Accreditation

By: Georgia Harris

Metrologists and laboratory supervisors must keep in mind that completing Appendix C, Part 1, and/or Appendix C, Part 2, and/or one of the ISO/IEC 17025 checklists provides only *part* of the answer to a complete internal audit. During the past submission cycle(s), we have asked laboratories to complete these portions for an internal assessment for WMD review. However, when it comes time for a 3rd party audit, most laboratories have found that these assessments “just aren’t enough” to satisfy the assessors. This has often come to the laboratory’s attention as a deficiency during a NVLAP or other 3rd party assessment. WMD will be working to correct this common oversight during 2003 Regional Measurement Assurance Program training sessions.

The ISO/IEC 17025 standard states:

4.13.1 The laboratory shall periodically, and in accordance with a predetermined schedule and procedure, conduct internal audits of its activities to verify that its

operations continue to comply with the requirements of the quality system and this International Standard [emphasis added]. The internal audit programme shall address all elements of the quality system, including the testing and/or calibration activities [emphasis added]. It is the responsibility of the quality manager to plan and organize audits as required by the schedule and requested by management. Such audits shall be carried out by trained and qualified personnel who are, wherever resources permit, independent of the activity to be audited. Note the phrases for which emphasis has been added: All parts of the quality system and this International Standard must be evaluated and include the technical aspects of the laboratory operation. From the training slides at the 2002 RMAP sessions, it was stated that an internal audit “must address all aspects of the quality system, including calibration activities.” This begs the question of “what constitutes the quality system?” We can go to portions of the section on Document Control for an answer.

4.3.1. General

The laboratory shall establish and maintain procedures to control all documents that form part of its quality system (internally generated or from external sources), such as regulations, standards, other normative documents, test and/or calibration methods, as well as drawings, software, specifications, instructions and manuals. [Emphasis added.]

Note 1: In this context “document” could be policy statements, procedures, specifications, calibration tables, charts, text books, posters, notices, memoranda, software, drawings, plans, etc. These may be on various media, whether hard copy or electronic, and they may be digital, analog, photographic or written.

Note 2: The control of data related to testing and calibration is covered in 5.4.7. The control of records is covered in 4.12.

4.3.2 Document approval and issue

4.3.2.1 All documents issued to personnel in the laboratory as part of the quality system shall be reviewed and approved for use by authorized personnel prior to issue. A master list or an equivalent document control procedure identifying the current revision status and distribution of documents in the quality system shall be established and be readily available to preclude the use of invalid and/or obsolete documents. [Emphasis added.]

Essentially, all aspects of the laboratory operation (technical and administrative) must be documented. A “master list” of all of these documents must be created, maintained, and readily available. And, all aspects of the laboratory operation covered by these documents must be assessed on a regular basis (the entire system within each year) as a part of the internal audit. The Asian-Pacific Laboratory Accreditation Program document (APLACTC002.pdf) that has been mentioned in this Newsletter and at the 2002 RMAP training sessions provides good guidance for planning an internal audit.

http://www.ianz.govt.nz/aplac/documents/web_docs/APLACTC002.pdf

The NIST Weights and Measures Division does not have the staffing/resources to evaluate *all* aspects of the laboratory program for *each* laboratory *every* year, so we focus on different aspects of the system for a detailed review and system-wide evaluation. Last year we focused on traceability documentation and calibration intervals. The overall responses and details provided last year were superb! We followed up with additional “traceability” training at the 2002 RMAP sessions. For the most recent review cycle we focused on the standard “checklists” and the “management review”. Overall, the recent management reviews and management participation have been excellent. We have seen some internal audits and management reviews that identified and

prioritized corrective actions in a clear and detailed manner. Of course there have been “gaps” and the Internal Audits and Management Reviews will be covered again at the 2003 Regional Measurement Assurance Program training sessions in our continuous improvement process for the program. ♦

WMD Metrologist Wins Prestigious Award

“Development of a CD-ROM Metrology Course at NIST” by Georgia Harris, tied for the “Algie Lance Best Paper Award” at the 2003 Measurement Science Conference. The paper presents the development process and the lessons learned from taking complex technical metrology concepts taught in a hands-on laboratory format and creating a highly interactive CD-ROM training experience. The CD-ROM course includes text, graphics, animation, video, and other multimedia interactivity to fully engage students.

The Mass Metrology course is nearing completion and is being translated and reprogrammed in the Spanish language. Both should be available later this year. Contact Georgia Harris for an electronic copy of the paper and/or to be placed on the mailing list to receive a copy of the CD-ROM when completed. The CD-ROM course will automatically be sent to everyone who has attended the Basic Mass for Industry or Basic Metrology for States seminars, so you don’t need to make a request for the training CD if you have attended one of these seminars. gharris@nist.gov. ♦

Interim Survey and Workload Survey – Coming Soon!

The NCWM Metrology Subcommittee has been refining an Interim Laboratory Survey and preparing for the next Laboratory Workload Survey. The Subcommittee members plan to circulate both surveys within the next few weeks, for completion by April 1, 2003.

The Interim Survey focuses on questions related to three broad categories of 1) Standards and Regulations, 2) Workload & Job Analysis, and 3) NIST Weights and Measures Division Feedback.

The first section focuses on the use/reference of regulations and documentary standards for purchase, compliance, and calibration submission requirements for field standards used in weights and measures enforcement activities, including NIST Handbook 105-x standards, ASTM and OIML standards, etc., where we are trying to analyze the harmonization and level of compliance to various standards for field equipment. Extra reference materials related to field standards that are in use by the weights and measures programs will also be collected. Section 1 also includes questions about government acceptance of calibration reports from industry laboratories and manufacturers.

The Workload Survey will essentially consist of the same questions as in the past two surveys. Contact Steve Sumner, NM (ssumner@nmda.nmsu.edu) or LF Eason, NC (LF.Eason@ncmail.net) for additional information. ♦

NIST Goes 17025!

By: Georgia Harris

NIST recently announced to staff that the current NIST Quality System (see: <http://www.nist.gov/nistsystem/>) which was adopted in January 2000 in support of the International Committee on Weights and Measures Mutual Recognition Arrangement (CIPM MRA) will be updated to enable NIST measurement services to conform with the international standard ISO/IEC 17025. Support for the enhanced direction in NIST’s quality system comes from NIST’s Director, Arden L. Bement, and from its Measurements Services Advisory Group (MSAG), chaired by Rich Kayser, Director of Technology Services with representation from all NIST laboratories.

Outside encouragement for this direction came from two primary sources. The International Committee on Weights and Measures (CIPM) Mutual Recognition Arrangement (MRA) requires that participating national metrology institutes (NMIs), of which NIST is one, establish a suitable way of assuring quality in the results of their calibration and measurement services. While the MRA does not mandate the use of ISO/IEC 17025, ISO/IEC 17025 is the internationally accepted approach.

A recent assessment of NIST's measurements and standards laboratories and subsequent report by the National Research Council stated that " NIST has in place a NIST quality system to document the steps it takes to ensure the quality of calibration and testing services on which its customers depend. Without meaning to imply that the current quality system is insufficient, the panel suggests that the NIST quality system more visibly conform to the ... ISO/IEC systems that its customers use and are familiar with" and that "the MSAG should expand the NIST quality system to include a statement of voluntary compliance with the ISO/IEC 17025 quality standard where applicable and appropriate to a national measurement institute."

Additional training on the ISO/IEC 17025 standard is planned for NIST staff in the next couple of months. Most of the NIST measurement laboratories already have quality manuals and procedural documentation in place to support the current quality system and have been implementing changes in support of ISO/IEC 17025 compliance. Many of the NIST laboratories are already undergoing internal NIST assessments to evaluate their levels of compliance and to identify those areas where corrective actions are needed. The planned NIST ISO/IEC 17025 implementation schedule is as follows:

-Completion of initial documentation assessments by December 31, 2003.

-Completion of full assessments by December 31, 2004.

NIST provides more than 500 calibration services as published in the NIST Special Publication 250. Thirteen divisions provide calibration services, but eight of those divisions provide 99.6 % of all NIST calibrations. Measurement services at NIST are full cost recovery programs as required by law with the exception of Standard Reference Data, which operates under special legislation (15 U.S.C. 290). See <http://ts.nist.gov/calibrations/> for NIST Calibration Services. ♦

Transition to the Metric System - A Window of Opportunity

By: Tom Coleman

The convergence of several economic factors provides a window of opportunity to facilitate the voluntary transition of the United States to the metric system of measurement. The transition to the metric system, which depends on an implementation strategy that facilitates the acceptance of the metric system by consumers will be driven by the economic interests of business. A major influence on consumer packages in the near future is the European Union (EU) Directive requiring all consumer packages marketed in the EU after January 1, 2010, be labeled in only metric units. This mandate, coupled with other global trends in the marketplace, indicates that the United States will see a gradual increase in consumer packages labeled only in metric units. There is a competitive advantage for multinational companies to market their products in a single set of packages and sizes for multiple markets. Labeling packages in only metric units increases the efficiency of companies to market their products, while giving consumers "reference points" within the metric system that will lead to an understanding of metric units. Understanding the metric system involves an educational process. Since much of learning is based on experience, this gradual learning process will ultimately lead to acceptance of the metric system in the United States. ♦

NIST HB 112 Examination Procedure Outlines for Commercial Weighing and Measuring Devices on Internet

By: G. Diane Lee

NIST Handbook 112 is now available for download from the Weights and Measures website at www.nist.gov/owm. If you have any questions, please contact Diane Lee by e-mail at diane.lee@nist.gov. ♦

State Laboratory Program 2003 Recognition Update

By: G. Diane Lee

Fifty-five (55) State, Local, and Federal legal metrology laboratories participate in the State Laboratory Program. The State Laboratory Program provides guidance, technical support and assistance to legal metrology laboratories to ensure accurate and traceable measurements.

One of the activities in this program is laboratory recognition. Participating laboratories submit information to NIST WMD for annual review; reviewed information includes measurement uncertainty data, traceability charts, internal assessment reports, management reviews and updated quality documentation (quality manuals, administrative procedures, etc.). The NIST WMD reviews the material and issues certificates of measurement traceability based on the review and acceptable laboratory conditions.

For the 2003 recognition cycle, the NIST WMD received submission material and issued review letters and/or measurement traceability certificates for 38 State metrology laboratories. We recently received submission material for 4 additional states, and the review and/or certificates of measurement traceability will be sent to those States shortly. Two laboratory submissions are incomplete, and additional information has been requested. Eleven (11) laboratories have not submitted material for review (of the 11 laboratories, 4 are not operational).

We appreciate the timely submissions of many of the laboratories this year and encourage those laboratories that have not submitted to submit their material for review. Individual laboratory recognition status will be available on the NIST WMD website, www.nist.gov/owm in April 2003. If you have any questions please contact G. Diane Lee by phone at 301-975-4405, by fax at 301-926-0647 or by e-mail at diane.lee@nist.gov or Georgia Harris by phone at 301-975-4014, by fax at 301-926-0647 or by e-mail at georgia.harris@nist.gov. ♦

OIML R59 “Moisture Meters for Cereal Grain and Oilseeds”

By: G. Diane Lee

Dr. Ambler Thompson is nearing completion of OIML Draft R59. The draft is based on the National Type Evaluation Program for Grain Moisture Meters. To ensure that U.S. Manufacturers and other interested parties have an opportunity to participate in the review of draft OIML documents and to assist us in conducting technical reviews we establish U.S. National Working Groups (NWG) for OIML documents. If you are interested in participating on the USNWG for Draft R59 or other grain moisture documents and have not responded to previous notices for participation, please forward your full name and title, your organization's name, mailing address, fax and telephone number and e-mail to G. Diane Lee by phone at 301-975-4405, by fax at 301-926-0647 or by e-mail at diane.lee@nist.gov. ♦

2003 Interim Update of GMM and NIR S&T Agenda Items

By: G. Diane Lee

S&T agenda items for grain moisture meters, 356(a)-1, 356(b)-1 and for Near Infrared Devices, 357-1 and 357-2 will be voting items at the 2003 NCWM annual meeting. These items along with the results from the 2003 Interim Meeting will be included in the S&T

Committee Interim Report of NCWM Publication 16. If you have any additional comments concerning these items, please forward your comments to G. Diane Lee by phone at 301-975-4405, by fax at 301-926-0647, or by e-mail at diane.lee@nist.gov. ♦

ASTM Committee F10 on Livestock, Meat, and Poultry Evaluation Systems

By: Dick Suiter

[Editor's Note: Any mention of commercial products within this publication is for information only and does not imply recommendation or endorsement by NIST.]

Prior to the NCWM 2000 Annual Meeting the Grain Inspection, Packers, and Stockyards Administration (GIPSA) branch of the United States Department of Agriculture (USDA) approached NIST and the NCWM to discuss the development of standards for devices used to measure fat content in animal carcasses. When it was determined that neither the NCWM nor NIST had the available resources needed to develop such a standard, the American Society for Testing and Materials (ASTM) was contacted as a potential standards-writing body to guide the task of developing the desired standard.

The ASTM agreed to develop standards known as ASTM Standard F10 on Livestock, Meat, and Poultry Evaluation Systems for the measurement of fat and other quality constituents in animal carcasses.

The devices used to evaluate the various constituents of animal carcasses play an important role in determining the value of the carcass for which the producer is paid. In most cases the devices perform functions that are considered commercial in nature. When the ASTM F10 standard is complete, the NCWM should consider developing requirements for these devices based on the final document.

The USDA reports that 35.2 million head of beef and 93.7 million hogs--a combined value of \$37.1 billion--were slaughtered in 2000. The USDA estimates that carcass evaluation systems were used to determine the value of the hogs processed in 36 pork plants in 15 states that process 84 percent of the nation-wide total. Until a few years ago, carcass evaluation for hogs dealt strictly with the weight and perhaps a subjective visual assessment of the fat and lean ratio. Today's consumer demands pork products with all the nutrition they are accustomed to, but with less fat and fewer calories.

In the past 10 to 15 years as pork packing companies started measuring carcass composition in terms of fat-to-lean ratio, producers have developed the new “ultra-lean hog.” Instrumentation and systems that can take linear measurements of fat and lean and calculate a lean percentage with an acceptable degree of accuracy have made this possible. Some of the systems are very sophisticated networks that can process multiple measurements rapidly enough to keep up with chain speeds in plants that process 1200 hogs or more per hour. Nearly all hogs processed in this country are evaluated for lean content and for most, this information is transferred back to the producer through some economic incentive program.

The measurement systems include the low-tech ruler used to measure the depth of fat at the midline split of the carcass. Higher tech optical probes use light diffraction to measure the depth of the fat and the depth of the lean in the loin area. Still higher tech hand-held ultrasonic devices use sound waves to produce measurements similar to those made by the optical probe. A sophisticated ultrasonic device called the Autofom uses 16 transducers in a saddle arrangement to measure a carcass every 1/2 in (12.7 mm) as it is pulled through a trough containing the transducers. The latest technology for measuring composition in hogs is the TOBEC, “total body electrical conductivity” instrument. This device, consisting of a tube containing a magnetic

field that actually measures the ions to calculate water content, can be used with a high level of accuracy to predict lean composition. The TOBEC is considered by many to be the most accurate of all systems but is not compatible to the high-speed operations found in most large packing plants. Other constituent variables such as pH, color, water holding capacity, and marbling are being considered by both the pork and the beef industry. Devices to determine some of these additional variables in pork are being developed and used on a trial basis.

The beef industry is also using electronic evaluation devices on a trial basis. Recently representatives from the USDA and NIST Weights and Measures Division witnessed the use of a new vision system for determining the value of a beef carcass. The system utilizes a digital camera that takes a picture of the loin area of a moving carcass. The digital camera provides a color photo to a computer that analyzes the digital image for various quality constituents such as the thickness of fat, depth of loin eye, color, and marbling. By comparing the image to a database containing "standards" for the various constituents, the system can determine grade and yield information for each carcass. When the trial phase is complete, this system has the potential of replacing human meat graders who make a somewhat subjective grade and yield determination for nearly every beef carcass processed in the United States.

The ASTM Committee F10 on Livestock, Meat, and Poultry Evaluation Systems is making progress developing a standard for the design, performance, use, and predictive accuracy of devices currently being used or being tested for evaluating several constituents that may be used to determine the value of an animal carcass at the time of slaughter. The four subcommittees – F 10.10 Design Specification, F10.20 Device Performance, F 10.30 User Requirements, and F 10.40 Predictive Accuracy – have each developed a draft standard

for its respective portion of the total ASTM Standard F10. The drafts from F10.10 and F10.30 have been posted on the ASTM website (<http://www.astm.org/>) for balloting by members of the full committee.

For additional information on F10 or on becoming a committee member, contact Dick Suiter (NIST) by e-mail at rsuiter@nist.gov or by phone at 301-975-4406. ♦

US/OIML Legal Metrology Comparison

By: Steve Cook

The following is a summary of the introduction in the DRAFT comparison report of the U.S. requirements for commercial weighing devices and those of the International Organization of Legal Metrology (OIML). The DRAFT document and introduction, prepared by Mr. John Elengo, P.E., consultant, is intended to provide an understanding of "harmonization" and to identify and clarify some of the similarities and differences between US legal metrology and OIML. The report provides a comprehensive comparison of the requirements and test procedures for scales in the 2003 Edition of NIST Handbook 44 (H44) Sections 1.10 "General Code," 2.20 "Scales," and applicable terminology in Appendix D "Definitions" with those contained in OIML Recommendation 76 (R76) "Non-automatic Weighing Instruments (Parts 1 and 2)" and Recommendation 60 (R60) "Metrological Regulation for Load Cells".

Harmonization: Metrology is the science and activity related to measurements. Legal metrology is the practice and process of applying regulatory structure and enforcement to metrology. It is to the benefit of society in such areas as commodity exchange or measured service, public health and safety, and protection of the environment that metrology be harmonized through reaching a national and international consensus.

Harmonization in legal metrology is the development in different countries of laws, regulations, testing requirements and testing procedures for the metrological control of measuring instruments and prepackages that permit manufacturers to market and sell their products with a minimum of different or duplicative requirements that must be met to ensure there are no technical barriers to trade.

Harmonization is achieved through 1) Mutual cooperation – working together towards common objectives through active participation within national and international forums, 2) mutual confidence – developing a sound technical basis for metrology in order to establish confidence and consensus among those affected, nationally and internationally, and 3) mutual recognition – accepting results of test and evaluation procedures for achieving the harmonized implementation of metrology.

Scope and Purpose of the US and OIML Documents: While both H44 and R76 facilitate the achievement of measurement credibility, there is a difference in approach. H44 sets forth metrological and technical requirements for weighing and measuring devices with the objective of eliminating from use those devices that give false readings. The requirements deal both with the characteristics of a device and of the use of the device. NCWM Publication 14 – National Type Evaluation Program sets forth the checklists and procedures for evaluating a device against the requirements of H44 in a uniform and traceable way. R76 sets forth the metrological and technical requirements for nonautomatic weighing instruments with the objective of evaluating an instrument's characteristics in a uniform and traceable way. The requirements in R76 are generally independent of installation conditions and use.

Both H44 and R76 strive to achieve performance-based requirements. Nevertheless, H44 and R76 each are influenced

by their respective objectives; H44 - to eliminate from use devices giving erroneous values, and R76 - to provide the uniform type evaluation of devices. H44's performance requirements tend to be application-oriented (e.g. vehicle scales, livestock scales, postal scales, etc.) whereas R76's performance requirements tend to be more device oriented (e.g., non-self indicating, semi-self or self indicating, with or without price computation, etc.).

Areas of Existing Harmonization: The General Code of Handbook 44 provides specifications, tolerances, and other technical requirements that are mutually applicable to weighing and measuring equipment regardless of category. There is no equivalent OIML Recommendation to the General Code; there are only separate Recommendations that apply to specific categories of weighing and measurement devices.

The Scale Code of Handbook 44 provides specifications, tolerances, and other technical requirements that are applicable to all types of weighing devices other than automatic bulk-weighing systems, belt-conveyor scales, and automatic weighing systems. The equivalent OIML Recommendation is R76 – Nonautomatic Weighing Instruments. A nonautomatic weighing instrument is an instrument [i.e., an nonautomatic or automatic indicating scale] used to determine the mass of a body that requires the intervention of an operator during the weighing process.

The terminology in Handbook 44 and the OIML Recommendations are in harmony. Nevertheless, significant differences in language (wording) may exist. Improvement should be considered where the language is confusing or has the potential for inconsistent interpretation.

NCWM Publication 14 provides the administrative procedures, technical policy, checklists, and test procedures applicable to the conduct of type

evaluations under the National Type Evaluation Program (NTEP). Chapters 1 and 5 of NCWM Publication 14 sets forth the technical policy for scales and load cells including test and examination procedures and a checklist to follow, thereby ensuring that the evaluation includes all applicable requirements (Chapter 5 also defines a test report format). Annexes A and B of R76-1 set forth the testing procedures for nonautomatic weighing instruments and the additional tests for electronic instruments, respectively. There is close harmony of requirements between R60 (1991) for load cells and Publication 14 except that, while metrologically equivalent, the format of the test report differs.

Publication 14 checklists have greater detail in order to facilitate the more uniform interpretation of requirements and conduct of type evaluations than R76 Annexes and R76-2. The Publication 14 checklists are reviewed and maintained by representatives of the various Participating Laboratories of NTEP that perform evaluations thereby promoting such uniformity. The checklists have also benefited from the joint review undertaken by representatives of their respective evaluation laboratories in association with the US/Canada Mutual Recognition of Type Evaluation Program.

Most Significant Areas of Departure: The number of accuracy classes and the tolerance values applied differ. H44 introduces a fourth step of tolerance values in each accuracy class corresponding with those in OIML R76 and adds a different accuracy class, Class IIIL. If there is a metrological or technical reason for having added a fourth step and an accuracy class, then it should be presented for international consideration so that R76 may be improved. If not, then harmonization with R76 should be considered.

Both NIST H44 and OIML R76 seek to uncover measurement shortfalls resulting from an electronic environment. H44

utilizes a pragmatic approach requiring that evaluation be conducted under the conditions existing at the site of use. R76 relies on the results of type evaluation under laboratory conditions using specialized test equipment. Both methods have value but may not be fully equivalent.

OIML R76 does provide requirements that instruments have proper design and construction and does provide for their uniform and proper verification. However, no user-based requirements are provided; that is, those dealing with the proper selection, installation, operation and maintenance of equipment. In order to facilitate harmonization and, lacking a substitute OIML Recommendation, the scope of R76 should be expanded to include user requirements that are internationally applicable.

Although R76 strives to set performance and not design requirements, it goes on to provide examples of “acceptable solutions” that are based on existing precedence and are considered in compliance. While not intended to be restrictive, these solutions can take on the strength of a requirement unless a different solution is accompanied by support.

What Can You Do? The comparison document will be the basis for proposed changes to promote alignment of the U.S. and OIML requirements. Your suggestions and feedback are important to the current activities of the NCWM Specifications and Tolerance Committee and assisting NIST in developing U.S. position papers regarding the upcoming revision of OIML R76. Contact Steven Cook for electronic or hard copies of the draft comparison document can be requested by e-mail at steven.cook@nist.gov or by phone at 301-975-4003. ♦

Correction to NIST Handbook 44 Scales Code

The Weights and Measures Division (WMD) announces a correction to a Scales Code formula in the 2003 Edition of NIST Handbook 44, "Specifications Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." The formula in paragraph S.5.4.(b) *Relationship of Load Cell Verification Interval Value to the Scale Division* for scales with lever systems that appears on page 2-12 is incorrect and should read as follows:

$$v_{\min} \leq \frac{d}{\sqrt{N} \times (\text{scale multiple})}$$

The formula above includes the correct information for the number of load cells in the scale (N) and scale multiple. The equation should specify that the scale division (d) is divided by the square root of N multiplied by the scale multiple. A mailing of Handbook 44 replacement pages, 2-11 and 2-12, were shipped to WMD customers. Please contact Juana Williams at 301-974-3989 or by e-mail at juana.williams@nist.gov, if you need additional copies or the mailing did not reach you. ♦



Calendar of Events

MARCH

10 – 14

SEMAP Regional Metrology Training
Regional Members Only
Pensacola, Florida
Contact: Georgia Harris, 301-975-4014

20 – 21

ASTM F10 Committee Meeting on
Livestock, Meat, and Poultry Evaluation
System
The Westin Crown Center
Kansas City, MO
Contact: James P. Olshefsky, 610-832-
9714; email: jolshefs@astm.org

27 – 30

ISWM Southern/Southeastern Division's
Joint Spring Meeting
Glenstone Lodge
Gatlinburg, TN
Contact: Michael W McDonald, email:
mcdscale@aol.com

31 – April 4

PA Association of Weights & Measures
Conference
Eden Resort Inn
Lancaster, PA
Contact: Jerry Buckley, 570-275-4747

31 – April 11

Basic Mass, Length & Volume for States
NIST, Gaithersburg, MD
Contact: Georgia Harris, 301-975-4014

APRIL

8 – 11

OH Weights & Measures Association
Technical Conference
Holiday Inn
Zanesville, OH
Contact: Agatha Shields, 614-462-7380

13 – 15

National Industrial Scale Association
(NISA) Spring Technical Conference
Memphis, TN
Contact : www.nisa.org

23 – 26

Scale Manufacturers Association (SMA)
Annual Meeting
Hilton Marco Island Beach Resort
Marco Island, FL
Contact: www.scalemanufacturers.org

27 – 30

NTEP Laboratories Spring Meeting
Doubletree Hotel
Sacramento, CA
Contact: Grace Jan, 240-632-9454

MAY

4 – 8

Central Weights & Measures Association
(CWMA) Annual Meeting
Amway Grand Hotel
Grand Rapids, MI
Contact: Pat Mercer, 517-655-8202

5 – 9

WRAP Regional Metrology Training
Regional Members Only
Portland, OR
Contact: Georgia Harris, 301-975-4014

12 – 15

Northeast Weights & Measures
Association (NEWMA) Annual Meeting
Holiday Inn
Grantville, PA
Contact: Ken Deitzler, 717-787-9089

12 – 16

Basic Mass Seminary for Industry
NIST, Gaithersburg, MD
Contact: Georgia Harris, 301-975-4014

13 – 15 (Tentative)

VTM Training
Executive Inn
Evansville, IN
Contact: G. Diane Lee, 301-975-4405

19 – 23

Course 202, Retail Computing Scales
Finley, OH
Contact: Ken Wheeler, 614-728-6290

29

ISWM Meeting
Orlando, FL
Contact: www.iswm.org

JUNE

9 – 13

Special NTEP Laboratory Basic
Metrology Seminar*(by invitation only)*

NIST, Gaithersburg, MD

Contact: Val Miller, 301-975-3602

16 – 20

Course 601, Checking the Net Contents
of Packaged Goods

Reynoldsburg, OH

Contact: Ken Wheeler, 614-728-6290

JULY

13 – 17

NCWM Annual Meeting

John Ascuaga's Nugget

Sparks, NV

Contact: Grace Jan, 240-632-9454

21 – 25

Course 601, Checking the Net Contents
of Packaged Goods

Canton, OH

Contact: Ken Wheeler, 614-728-6290

AUGUST

17 – 21

NCSL International

Tampa, FL

Contact: www.ncsli.org/conference/2003

20 – 22

Grain Moisture Meeting

Chase Suites Hotel

Kansas City, MO

Contact: Diane Lee, 301-975-4405

SEPTEMBER

7 – 9

Central Weights & Measures Association
(CWMA) Interim Meeting

Jumers Castle Lodge

Bettendorf, IA

Contact: Pat Mercer, 517-655-8202

11 – 13

NTETC Weighing Sector

Picadilly Inn

Fresno, California

Contact: Steve Patoray, 828-359-6178

14 – 19

Annual Western Weights & Measures
Association (WWMA) Technical

Conference

Picadilly Inn

Fresno, California

Contact: Clark Cooney, 503-986-4677

OCTOBER

3 – 4

NTETC Measuring Sector

Hyatt Charlotte

Charlotte, NC

Contact: Steve Patoray, 828-359-6178

5 – 8

Southern Weights and Measures

Association (SWMA) Annual Meeting

Hyatt Charlotte

Charlotte, NC

Contact: Winston Sutton, 919-733-3313

6 – 10

SWAP Regional Metrology Training

(Regional members only)

TX

Contact: Georgia Harris, 301-975-4014

13 – 17

MidMAP Regional Metrology Training

(Regional members only)

MI

Contact: Georgia Harris, 301-975-4014

20 – 24

NEMAP Regional Metrology Training

(Regional members only)

NH

Contact: Georgia Harris, 301-975-4014

26 – 28

National Industrial Scale Association

(NIST) Fall Technical Conference

Louisville, KY

Contact: www.nisa.org

27 – 31

Basic Mass Seminary for Industry

NIST, Gaithersburg, MD

Contact: Georgia Harris, 301-975-4014

28 – 31 Ohio W&M Annual Training
School

Holiday Inn East

Columbus, OH

Contact: Ken Wheeler, 614-728-6290

NOVEMBER

3 – 7

Intermediate Metrology Seminar

NIST, Gaithersburg, MD

Contact: Georgia Harris, 301-975-4014

5 – 8

Scale Manufacturers Association (SMA)

Fall Meeting

LaPlaya Beach Resort

Naples, FL

Contact: Kimberly, SMA,

239-514-3441 x10

DECEMBER

1 – 5

Advanced Mass Hands-On Seminar

(Advanced Class is a Prerequisite)

NIST, Gaithersburg, MD

Contact: Georgia Harris, 301-975-4014

2004**MAY**

10 – 13

Northeast Weights & Measures

Association (NEWMA) Annual Meeting

Best Western

Portsmouth, NH

SEPTEMBER

11 – 17

Western Weights & Measures Association
(WWMA) Annual Meeting

Holiday Inn

Sacramento, CA

Contact: Roger Macey, 916-229-3043

For meetings and events for the American Petroleum Institute (API), please check the API website at www.api.org and click on the Meetings and Training Section under the "Energy Professional Site" bullet on the left-hand portion of the home page. Information for American Society for Testing and Materials (ASTM) meetings is available at www.astm.org on their Internet website. Click on the "Meetings" bullet on the left-hand portion

of the home page. These meetings and seminars are updated on a continuous basis.

If you want your meeting, conference or training session included in the Calendar of Events, please contact Lynn Sebring 301-975-4006 (E-Mail: lynn.sebring@nist.gov). ♦

